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## RESUME

Dr. Terry M. Bricker  
Position: Professor

### EDUCATION:

INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Miami University Univ. Missouri	Ph.D. Postdoctoral Work	1981 1981-1985	Botany Biological Sciences

### RESEARCH AND PROFESSIONAL EXPERIENCE:

- National Science Foundation, IGERT Pre-proposal Panel, 9/00.  
Interim Chairperson, Department of Biological Sciences, 6/99-8/00.  
Moreland Family Professor of Basic Sciences, Department of Biological Sciences, 4/99-Present  
Invited Speaker, Gordon Research Conference Photosynthesis-Biochemical Aspects, 6/99.  
Editorial Committee, Annual Reviews of Plant Physiology and Plant Molecular Biology - Vol. 52, 10/98.  
Adjunct Professor, Department of Chemistry, Louisiana State University, 3/98-Present.  
Professor, Department of Biological Sciences, Louisiana State University, 7/97-Present.  
Professor and Chairman, Department of Microbiology, Louisiana State University, 7/95-6/97.  
National Science Foundation, Research Training Grant site visit team to Penn State University, 6/96  
National Science Foundation, Research Training Grant Advisory Panel, 4/96  
Discussion Leader, Gordon Research Conference, "Photosynthesis – Biochemical Aspects", 8/96  
Visiting Professor, Department of Plant Biology, University of Illinois 1/95-6/95.  
Professor, Department of Plant Biology, Louisiana State University, 8/94-7/95.  
Visiting Faculty, Plant Biochemistry Intensive Summer Course, MSU-DOE Plant Research Laboratory, Michigan State University, 6/94.  
Associate Professor, Department of Botany, Louisiana State University, 8/90-7/94.  
Invited Speaker, Gordon Research Conference, "Photosynthesis - Biochemical Aspects", 8/93.  
Director, Protein Analysis Center, College of Basic Sciences, 7/90-8/92.

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Graduate Coordinator, Department of Botany, Louisiana State University, 9/89-8/92.

Department of Energy, *Ad hoc* Advisory Panel Basic Energy Biosciences, 1991.  
National Science Foundation Molecular Biochemistry Program Advisory Panel,  
10/90-4/94.

Assistant Professor, Department of Botany, Louisiana State University, 8/87-8/90.  
Editorial Board, *Plant Physiology*, 1/90-7/92.

Assistant Professor, Department of Chemistry, University of Southern Mississippi, 1/85-8/87.

#### Publications (last five years, only)

56. Rosenberg, C., Christian, J., Bricker, T. M. and C. Putnam-Evans, "Site-Directed Mutagenesis of Glutamate Residues in the Large Extrinsic Loop of the Photosystem II Protein CP 43 Affects PS II Assembly." To appear *Biochemistry*.
55. Bricker, T.M. and Frankel, L.K. "The Role of Carboxylic Acid Residues on the Manganese-Stabilizing Protein in its Binding to Photosystem II." To appear *Biochemistry*.
54. Wu, J., Masri, N., Lee, W., Frankel, L.K. and T.M. Bricker, "Directed Random Mutagenesis in the Large Extrinsic Loop of the CP 47 Protein of Photosystem II." *Plant Molecular Biology* 39,381-386 (1999).
53. Knoepfle, N., Bricker, T.M., and Putnam-Evans, C., "Site-Directed Mutagenesis of the Basic Residues  $^{305}\text{R}$  and  $^{342}\text{R}$  in the CP 43 Protein of Photosystem II Affects Oxygen-Evolving Activity in *Synechocystis* 6803." *Biochemistry* 38,1582-1588 (1999).
52. Bricker, T.M., Morvant, J., Masri, N., Sutton, H. and Frankel, L.K., "Isolation of an Oxygen-Evolving Photosystem II Preparation from *Synechocystis* 6803 using a Histidine-Tagged Mutant of CP 47." *Biochimica et Biophysica Acta* 1409, 50-57 (1998).
51. Zubrzycki, I.Z., Frankel, L.K., Russo, P.S. and T.M. Bricker, "Hydrodynamic Studies on the Extrinsic "33 kDa" Protein of Photosystem II." *Biochemistry* 37,13553-13558 (1998).
50. Ghanotakis, D., Tsotisz, S. and T.M. Bricker, "Polypeptides of Photosystem II: Structure and Function." In: *Plant Photobiology: Photosynthesis and Photomorphogenesis* (Singhal, G.S., Renger, G., Sopory S.K. Irrgang, K.-D. and Govindjee, eds.) pp. 264-291, Narosa Publishing House, New Delhi, India (1998).
49. Bricker, T.M. and L.K. Frankel, "Structure and Function of the 33 kDa Extrinsic Protein of Photosystem II." *Photosynthesis Research* 56:157-173 (1998).

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48. Bricker, T.M., Putnam-Evans, C. and J. Wu, "Mutagenesis in the Study of the Structure and Function of Photosystem II." *Methods of Enzymology* 297:320-337 (1998).
47. Qian, M., Al-Khalidi, S., Putnam-Evans, C., Bricker, T.M. and R.L. Burnap, "Photoassembly of the Photosystem II ( $Mn_4$ ) Cluster in Site-Directed Mutants Impaired in the Binding of the Manganese-Stabilizing Protein." *Biochemistry* 36,15244-15252 (1997).
46. Putnam-Evans, C. and T.M. Bricker, "Site-Directed Mutagenesis of the Basic Residue  $^{321}R$  to  $^{321}G$  in the CP 47 Protein of Photosystem II Alters the Chloride Requirement for Growth and Oxygen-Evolving Activity in *Synechocystis 6803*." *Plant Molecular Biology* 34:455-463 (1997).
- 45 Putnam-Evans, C., Wu, J., and T.M. Bricker, "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II: Alteration of Conserved Charged Residues within Lethal Deletions in the Large Extrinsic Loop of CP 47", *Plant Molecular Biology* 32:1191-1195 (1996).
44. Wu, J., Putnam-Evans, C., and T.M. Bricker, "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II:  $^{167}W$  in the Lumenally Exposed Loop C is Required for Photosystem II Assembly and Stability.", *Plant Molecular Biology* 32,537-542 (1996).
43. Bricker, T.M. and Demetrios Ghanotakis "The Structure and Function of the Oxygen-Evolving Complex" In: *Advances in Photosynthesis, Vol. 4, Oxygenic Photosynthesis: The Light Reactions*, pp. 113-136, Yocum, C.F. and Ort, D.R., eds. (1996).
42. Putnam-Evans, C., Wu, J., Burnap, R. Whitmarsh, J. and T.M. Bricker, "Site-Directed Mutagenesis of the CP 47 Protein of Photosystem II Alteration of Conserved Charged Residues in the Domain  $^{364}E-^{444}R$ ", *Biochemistry* 35,4046-4053 (1996).
41. Leuschner, C. and T.M. Bricker, "Interaction of the 33 kDa Extrinsic Protein with Photosystem II: Rebinding of the 33 kDa Extrinsic Protein to Photosystem II Membranes which Contain Four, Two, or Zero 40. Manganese per Photosystem II Reaction Center." *Biochemistry* 35,4551-4557 (1996).
40. Frankel, L.K. and T. M. Bricker, "Identification of Domains on the 33 kDa Extrinsic Protein which are Shielded from NHS-Biotinylation by Intrinsic Photosystem II Components", *Biochemistry* 34,7492-7497 (1995).

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RAJIV K. SINGH

Materials Science and Engineering  
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#### Research Interests:

Innovative processing of materials; Laser processing; thin films; transient thermal phenomena; superconducting and dielectric (low K and high K) thin films; diamond and related materials, rapid thermal processing of elemental and wide band gap semiconductors, chemical-mechanical planarization, particulate coatings; semiconductor processing; modeling of transient thermal processing; flat panel displays, Angstrom scale advanced materials characterization, oxide thin films & electronics, gallium nitride and diamond crystal growth, nanoparticle synthesis and processing, front and back end semiconductor cleaning, phosphors and flat panel displays, thin film batteries.

#### Education

Ph.D. Materials Science and Engineering, North Carolina State University, Raleigh, 1989  
M.S. Materials Science and Engineering, North Carolina State University, Raleigh, 1987  
B.S. Chemical Engineering, Jadavpur University, Calcutta, India, 1985

#### Positions Held

97-pre *Professor*, Materials Science and Engr., University of Florida  
94-pre *Director*, Characterization Research Instrumentation and Testbed (CRIT) Facility,  
Engineering Research Center (ERC), University of Florida  
96-pre *Thrust Leader*, Chemical Mechanical Planarization (CMP), ERC Univ of Florida  
94-pre *Thrust Leader*, Engineered Particulates, ERC, Univ. Florida  
95-97 *Associate Professor*, Materials Science and Engr., University of Florida  
90- 94 *Assistant Professor*, University of Florida, Gainesville, FL

#### Awards/Honors

- 2000 - *Distinguished Visiting Scientist*, NIRIM, Tsukuba, Japan
- 1999 *Distinguished Visiting Professor*, National University of Singapore, Singapore
- 1998 *Distinguished Visiting Professor*, University of Osaka, Osaka, Japan
- 1995 *Hardy Gold Medal* from TMS/AIME for Outstanding Contributions in Materials Science
- 1994 *NSF Young Investigator Award*
- 94-97 *Visiting Fellow*, Center for Ultrafast Optical Science (CUOS), University of Michigan
- 1993 *IEEE Senior Member Award*
- 1991 *IBM Faculty Development Award*
- 1989 *MRS Best Graduate Student Award*
- 1985 *Alumni Gold Medal* for Best Overall Graduating Senior from the University
- 1985 *Laha Silver Medal* for Best Graduate from College of Engineering

#### Publications:

Over 293 papers (> 268 published/in print & 25 submitted for various materials science and engineering journals (*Science*, *Physical Review B*, *Applied Physics Letters*, *Journal of Materials Research*, *Materials Science and Engineering B*, etc.) and Conference Proceedings. Published over 32

original, *principal author papers in App. Phy. Lett.* (The most cited electronic materials/applied physics based journal), and 7 papers published in *Physical Review B*

### **Invited and Contributed Talks**

Presented more than 110 invited talks at international conferences (MRS, SPIE, TMS, APS, ASME, etc.) and academic and research institutions (MIT, Columbia, Purdue, ORNL, Westinghouse, etc.). Also group presented over 250 technical papers at international conferences

### **Books and Guest Editorships (Edited 5 books & Guest Editor of 5 Journal Issues)**

- (1) R. K. Singh, D. Norton, J Cheung and J. Narayan and L.D. Laude , *Eds "Laser Processing of Materials: Fundamentals and Advanced Applications*, MRS Proceedings Vol 397, Pittsburgh, PA, 1996
- (2). N. M. Ravindra and R.K. Singh,"*Transient Thermal Processing of Materials*", TMS, Warrendale April. 1996
- (3). K. Gonsalves, M. Baraton, J.. Chen, J. Alkara, R. K. Singh and H. Hofmann , "*Surface Controlled Nanoscale and Microscale Materials for High Value Added Applications*, MRS Proceedings Vol 501 , Pittsburgh, PA, March 1998
- (4). R.K. Singh, D. Lowdnes, J. Narayan, D. Chrisey , T. Kawai, and E. Fogarassy, Editors, *Advances in Laser Ablation of Materials*", MRS Proceedings for Spring 1998 .
- (5). R. K. Singh and D. Kumar, "*Advances in Pulsed Laser Deposition of Thin Films*", Kluwer publishers, (1998)
- (1)*Guest Editor* of September 1994, Vol 23 issue of *Journal of Electronic Materials* titled "*Novel Issues in Photonic Materials*"
- (2) *Guest Editor* of Jan,96, Vol 1 issue of *Journal of Electronic Materials* titled "*Ion and Laser Beam Processing of Electronic Materials*"
- (3) *Guest Editor* of Materials Science and Engr. B, on *Laser Processing of Electronic Materials*, Jan 1997
- (4) *Guest Editor* of November 1997 Issue of *Journal of Electronic Materials* on "*Low Energy Beam Processing of materials.*"
- (5)*Guest Editor* of September 1998 Issue of *Journal of Electronic Materials* on "*Chemical-Mechanical Polishing of Semiconductors*.

### **Teaching Accomplishments**

Developed four new courses:"Beam-Solid Interactions", "Thin Films" & "Math. Methods", "Survey of Materials Analysis" in the graduate MS&E program

Graduated 12 Master's and 10 Ph.D Students; Presently thesis advisor to 9 Ph. D Students  
8 students awarded best paper/fellowships for their undergraduate/graduate research projects.

Developing CD-ROM materials and multi-media classroom for the NSF ERC project.

Established ParTiN (Particle technology) Hypertext Network for educational &ERC programs on the WWW (World Wide Web)

### **Corporate Interactions**

Direct Research Interactions with several companies including IBM, Intel, Motorola, Ashland Chemical, Westinghouse, Lucent Technology, Applied Materials, Sony, Glaxo Wellcome, Lockheed Martin, Astra Zeneca, Purdue Pharma

Licensing Discussions with Sony, Nara Machinery, Astra Zeneca, Glaxo, etc.  
Corporate funding over 200 K/yr.

**Copyrighted Softwares** (3 copyrighted softwares) including

(A) **SLIM** (*Simulation of Laser Interaction with Materials*, 36,000 coded lines, 1992) software. This first of its kind software is being used by more than 50 R&D groups (IBM, LANL, ORNL, etc.) in the world. This software calculates the transient thermal induced laser effects like melting, crystallization and ablation of materials. This software has had sales greater than \$ 60 K worldwide in the last four years. Two new versions ( one based on DOS C++ and the other on Windows platform) have been developed..

**Patents** (from a total of 30 disclosures:[ 14 patents, 10 awarded/pending(final stage) and 4 filed])

- (1) **High Surface Area Metals and Ceramics** [US Patent 5,473,138]. A unique laser technique has been developed to increase the surface areas of ceramics, metals and composites. This technique involves the use of multiple-pulse laser irradiation under controlled energy window conditions.
- (2) **Enhanced Chemical Vapor Deposition of Diamond** [US Patent 5,485,804 {1996}, Filed for worldwide patent} Novel colloidal method for large area nucleation, of diamond. *This method has been used to make the world's largest single monolithic piece of diamond which has a diameter greater than 11" and weighs over 1600 carats.*

**Conference Chairs** [Organized 16 international conferences on innovative processing and characterization of materials]

- (1) Chair of Symposium. on "Beam Processing of Materials", *TMS/AIME Winter meeting*, Chicago Nov 92;
- (2) Co-Chairman of Symposium on "Innovative Processing of Electronic and Photonic Materials" *TMS/AIME Annual Meeting*, Denver, Feb 1993;
- (3) Chairman of Conference on "Advanced Laser Processing of Materials" *Engineering Foundation Conf.*, Palm Coast, FL, May 1-6 1994;
- (4) Chair of Symposium on " Ion Beam Processing of Materials" *TMS Spring Meeting*, LasVegas, Feb 1995
- (5) Co-Chair of symposium on "Laser Processing of Materials" *American Physical Society*, San Diego, March 1995
- (6) Chair of Symposium on " Advanced Laser Processing of Materials: Fundamentals and Advanced Applications" *MRS Meeting*, Boston Nov 1995
- (7) Co-Chair, Symposia on "Transient Thermal Processing of Materials", *TMS Annual Meeting*,Anaheim, CA Feb, 1996
- (8)Chairman of symposium on, " Low Energy Beam Processes", *TMS Annual Meeting*, Orlando , FL Feb, 1997
- (9)Chairman of symposium on " Particulate Coatings", *MRS Fall Meeting*, Boston November, 1997
- (10) Co-Chairman of " Laser and Ion Beam Processing of Materials", *International Union of Materials Research Societies (IUMRS)*, Chiba, Japan, September 1997
- (11) Co-Chairman," Transient Thermal Processing of Materials , *TMS Annual Meeting*, San Antonio, Feb 1998
- (12) Co-Chairman," Chemical Mechanical Planarization of Materials Symposia, *TMS Annual Meeting*, San Antonio, Feb 1998
- (13) Chairman, " Advances in Pulsed Laser Ablation of Materials", *MRS Spring Meeting*, San Francisco, April, 1998

- (14) Co-Chairman, "Particulate Coatings" 5th World Congress on Particle Science and Technology, Brighton UK, July 1998
- (15) Co-Chairman "Rapid Thermal Processing of Materials"- European MRS Meeting, Strasbourg, June, 1998
- (16) Chairman, "Chemical Mechanical Polishing Symposia", MRS Spring Meeting, San Francisco, April 2000

### Invited Review Articles

- 1. "Pulsed Laser Deposition of Thin Films", *Materials Science and Reports* in March, (1998)
- 2. "SLIM, A Personal Computer Based Simulation of Laser Interaction With Materials", *J. Journal of Materials*, 44, 20 (1992)
- 3. "Pulsed Laser Deposition and Processing of Superconducting Thin Films", *J. of Materials* 43, 13 (1991)

### Book Chapters

- 1. D. Gilbert and R. K. Singh, "Boron Nitride Interfaces", in "Properties of Group III Nitrides", Edited by James Edgar, Imspec publication, London 1995
  - 2. R. K. Singh, "Raman Based Optical Properties of YBaCuO Surfaces", in "Optical Properties of Materials", Eds R. Hummel, CRC Press, 1996
  - 3. R.K. Singh and D. Kumar, "Pulsed Laser Deposition of Superconducting Thin Films", *Materials Science and Engr. Reports* (in press, 1996)
  - 4. R. K. Singh and D. Kumar, "Thermal Annealing of Semiconductors", *Encyclopedia of Applied Physics*, VCH Publishers (1996)
  - 5. D. Gilbert and R. K. Singh, "Diamond Deposition for Electronic Applications", Eds . S. Pearton on *Wide Band Gap Semiconductors*", VCH Publishers 1997
- )

### Reviews

Reviewer for NSF, DOE, Physical Review B, Materials Science and Engineering, Journal of Applied Physics, Applied Physics Letter, Journal of Materials Research and Physica C.  
Invited to serve as panel members for several NSF initiatives

### Memberships and Committee Chairmanships:

Member of MRS, ASM, TMS, IEEE (senior member), APS, AIChE, SPIE  
Chairman: Thin Films and Interfaces Committee , TMS (1993 -1996)  
Member: Laser Processing of Materials Committee, CLEO

### Institutional Impact

- (A) Helped establish the 60 million, NSF Funded *Engineering Research Center (ERC)* on particle science and technology at the University of Florida:
- (B) Leader of team for the NSF MRSEC Proposal submitted in 1995 & 1997
- (C)Established cross-disciplinary multi P.I programs in Rapid Thermal Processing, Particle Coating Technology, Radiation Damage in Electronic Devices, and Beam Processing of Materials:
- (D) Established industrial and scientific collaborations with various institutions:
- (E) Established international collaborations with

(i) CNRS, Strasbourg France, (ii) University of Melbourne, Australia, (iii) University of Osaka, Japan, (iv) Keio University, Japan, (v) EPFL, Lausanne, Switzerland, (vi) Unicamp, Sao Paulo Brazil, (vii) National University, Singapore